CLAIMS

WHAT IS CLAIMED IS:

1. A method for distributing a reference time in a network having a plurality of nodes, the method comprising the steps of:

generating a network-wide time signal using a reference time generator;

distributing the network-wide time signal over the network to the plurality of nodes;

converting, at each respective node, the network-wide time signal to a local synchronization signal; and

synchronizing the timing of each node using the local synchronization signal.

2. The method of claim 1, further comprising the step of:

tracking signal propagation delay at each node of the network using the network-wide time signal; and

wherein the step of converting includes the step of:

generating the local synchronization signal using the signal propagation delay of the respective node.

3. The method of claim 2, wherein the step of tracking further comprises the steps of:

maintaining a network-wide time signal as a network cycle master signal at a designated cycle master node of the plurality of nodes of the network;

maintaining a local cycle master signal at each respective node of the network; and

determining the signal propagation delay at each respective node from the difference between the respective local cycle master signal and the network cycle master signal.

4. The method of claim 3, wherein the network cycle master signal and each local cycle master signal is stored in a respective network cycle master register and local cycle master register, respectively, at each respective node.

5. The method of claim 1, wherein the network-wide time signal is a house synchronization (synch) signal.

6. The method of claim 1, wherein the local synchronization signal has an associated frequency.

7. The method of claim 1, wherein the step of synchronizing includes the step of: phase locking the local synchronization signal to a predetermined cycle value.

8. The method of claim 1, wherein the step of synchronizing includes the step of: performing delay compensation at each respective node.

9. The method of claim 8, wherein the delay compensation is performed by adding an extra signal delay to the local synchronization signal.

10. The method of claim 1, wherein the plurality of nodes includes:
at least one IEEE 1394-compliant node.

11. The method of claim 1, wherein the step of generating the network-wide time signal includes the step of:

utilizing a rubidium reference signal generator.

12. The method of claim 1, wherein the step of generating the network-wide time signal includes the step of:

utilizing a global positioning system (GPS)-based reference signal generator.

13. A system comprising:

a network including a plurality of nodes; and

a reference time generator for generating a network-wide time signal;

wherein a designated node of the plurality of nodes is connected to the reference time generator, and distributes the network-wide time signal over the network to the plurality of nodes; and

wherein each node of the plurality of nodes of the network converts the network-wide time signal to a local synchronization signal, and synchronizes the timing of each node using the local synchronization signal.

14. The system of claim 13, wherein each node tracks signal propagation delay using the network-wide time signal, and converts the network-wide time signal by generating the local synchronization signal using the signal propagation delay of the respective node.

15. The system of claim 14, wherein the designated node maintains the network-wide time signal as a network cycle master signal; and

wherein each respective node of the plurality of nodes maintains a local cycle master signal, and determines a respective signal propagation delay at each respective node from the difference between the respective local cycle master signal and the network cycle master signal.

16. The system of claim 15, wherein designated node includes a network cycle master register for storing the network cycle master signal; and

each node of the plurality of nodes of the network includes a respective local cycle master register for storing the local cycle master signal.

17. The system of claim 13, wherein the plurality of nodes includes:

at least one IEEE 1394-compliant node.

18. A system for facilitating timing functions in a network, the system comprising:

a plurality of nodes forming the network, with each node performing local timing control;

a reference time generator for generating the network-wide time signal; and

a plurality of applications operating using timing functions under local timing control, with each node of the plurality of nodes associated with at least one application;

wherein a designated node of the plurality of nodes is connected to the reference time generator, and distributes the network-wide time signal over the network to the plurality of nodes; and

wherein each node of the plurality of nodes of the network converts the network-wide time signal to a local synchronization signal, and synchronizes the timing of each node and the at least one application associated with the respective node using the local synchronization signal.

19. The system of claim 18, wherein the designated node maintains the network-wide time signal as a network cycle master signal in a network cycle master register; and

wherein each node tracks signal propagation delay using the network-wide time signal, and converts the network-time signal by generating the local synchronization signal using the signal propagation delay of the respective node, to maintain a respective local cycle master signal in a respective local cycle master register, and to determine a respective signal propagation delay at each respective node from the difference between the respective local cycle master signal and the network cycle master signal.

20. The system of claim 18, wherein the plurality of nodes includes:

at least one IEEE 1394-compliant node.